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GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

PART VII ENGINEERING GEOLOGY

(*First Revision*)

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(First Revision)

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GLOSSARY OF TERMS RELATING TO RIVER VALLEY PROJECTS

PART VII ENGINEERING GEOLOGY

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part VII) (First Revision) was adopted by the Indian Standards Institution on 25 February 1982, after the draft finalized by the Terminology Relating to River Valley Projects Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 This standard was first published in 1968. This revision has been prepared in the light of the experience gained in the use of the standard during the course of years. A number of modifications have been made prominent among which are additions of several new terms relating to few common rocks including typically Indian types. This does not, however cover definitions relating to minerals.

0.3 In the formulation of this standard due weightage has been given to international co-ordination among standards and practices prevailing in different countries in addition to relating it to the practices in the field in this country.

1. SCOPE

1.1 This standard (Part VII) covers definitions of terms commonly used by engineering geologists and civil engineers. However, a few common rocks, including typically Indian types, have been included for the purpose of convenience. The names of rocks are marked with an asterik and those of minerals in the text are given in italics:

2. DEFINITIONS

2.1 Ablation — A term to describe the surface melting of glaciers.

2.2 Acceleration (Due to Gravity 'g') — The acceleration of a body falling freely in a vacum to the gravitational attraction of earth.

Note — The International Committee on Weights and Measures has adopted as a standard or accepted value of 980·665 cm/sec^2 but its true value varies with latitude, altitude and the nature of the underlying rocks.

2.3 Accretion — Any process of accumulation by flowing water whether of silt, sand, pebbles, etc. The difference between accretion and alluviation is that the latter is due to retardation of flow whereas the former may be due to any cause and in fact induces alluviation.

2.4 Acidic Rocks — A descriptive term applied to those igneous rocks that contain more than 65 percent silica.

2.5 Adit — *See* 2.56.

2.6 Aeolian Deposits — Finely divided gragmentary deposits transported by wind. They include sand dunes, desert sand, loess and some volcanic tuffs and ashes.

2.7 Agglomerate — A coarse textured rock, resulting from explosive volcanic activity and consisting chiefly of angular fragments of igneous rocks embedded in an ashy matrix.

2.8 Aggradation — The natural filling up of the bed of a water course by deposition of sediment.

2.9 Alluvial Fan — A sloping, fan-shaped mass of loose rock-material deposited by a stream at the place where it emerges into a broad valley or a plain or in any other large quiscent body of water.

2.10 Alteration — Strictly, any physical or chemical change in a rock or mineral subsequent to its formation. However, the term excludes cementation or induration sediments to form hard rocks.

2.11 Amphobolite — A foliated metamorphic rock of medium to coarse grain, composed mainly of *hornblende* and *plagioclase*.

2.12 Anticiline — An arch-like upfold in stratified rocks.

2.13 Antiform — An upright or inclined fold closing upwards with unknown stratigraphic relationship of the individual beds therein.

2.14 Aplite — A light-coloured, finely crystalline variety of granite occurring as dykes or veins.

2.15 Apparent Dip — *See* 2.52.

2.16 Aquiclude — A formation which, although porous and capable of absorbing water, does not permit its movement at rates sufficient to furnish an appreciable supply for a well or spring.

2.17 Aquifer — A formation, group of formations or part of a formation that is water bearing.

2.18 Arenaceous — Rocks predominantly composed of sand with sandy texture (for example, sandstone). Also referred to as psammitic.

2.19 Argillaceous — Rocks containing appreciable amount of clay. Also referred to as pelitic.

2.20 Artesian Water — Ground water that is confined by impervious material and is under sufficient hydrostatic pressure to rise above the zone of saturation.

2.21 Altitude — A term to designate the strike and dip together of an inclined plane.

2.22 Augen — A term applied to large lenticular mineral grains or aggregates of minerals which in cross-section have the shape of an eye. They usually occur in metamorphic rocks.

2.23 Avalanche — A large mass of snow ice, or chunks of rock, stones or sands separately or in combination moving rapidly down a slope.

2.24 Basalt — *See* IS : 1123-1975†.

2.25 Basement Rock (Complex) — A term commonly applied to metamorphic or igneous rocks underlying the sedimentary sequence constituting the basement of subsequent sedimentary deposition.

2.26 Basic Rocks — A term applied to igneous rocks having a relatively lone percentage of silica (under 55).

2.27 Bedding Plane — The interface between two adjacent beds of sedimentary rock.

2.28 Bedrock — Any *in situ* rock underlying soil, sand, silt, clay, gravel, etc.

2.29 Bentonite — A generalized term which refers to a rather heterogeneous substance, composed mainly of the clay mineral montmorillonite, beidellite, illite, kaolinite and fragments of other minerals, such as felspar, gypsum, calcite and quartz. Bentonite has got a great ability to adsorb or absorb water and swell accordingly.

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†Method of identification of natural building stones (*first revision*).

2.30 **Boulder Clay** — *See* 2.225.

2.31 **Breccia** — Rock consisting of fragments, more or less angular in a matrix of fine-grained material. May be formed by faulting or crushing (tectonic breccia), by erosion (clastic breccia), by collapse, by replacements bordering fractures or by volcanism (volcanic breccia).

2.32 **Calcareous** — Composed essentially of calcium carbonate.

2.33 **Carbonaceous** — Containing carbon, usually of organic origin.

2.34 **Cataclastic** — A texture produced by dynamo thermal metamorphism and characterised by crushed, fragmentary deformed and strained crystals.

2.35 **Charnockite** — A hypersthene-quartz-felspar rock with or without garnet, characterized by greenish-blue felspars and greyish-blue quartz, the dominant felspar being a microperthite.

2.36 **Chert** — A compact silicious rock formed of chalcedonic or opaline slicia one or both and of organic or precipitated origin.

2.37 **Clastic Rocks** — Rocks composed of fragments of older rocks (for example, sand stones, conglomerates, etc).

2.38 **Clay-Shale** — A variety of shale which is not sufficiently indurated to break in a distinctly platy fashion parallel to bedding and which, on weathering, again becomes clay.

2.39 **Clay-Stone** — Indurated and hard clay, more or less massive with a blocky habit of fracture.

2.40 **Cleavage** — In a crystalline mineral or rock, the property to split along one or more sets of parallel planes.

In a rock, definite parallel closely spaced planes along which it may split and which may be highly inclined to the bedding planes.

2.41 **Coarse Grained** — Rocks whose grains are greater in diameter than 5 mm.

2.42 **Concretions** — Masses of differing chemical and mineralogical nature contiguous to the enclosing rock.

2.43 Conformable — Beds or strata lying one upon another in an unbroken, parallel order and indicating that no disturbances or denudation has taken place during their deposition, are said to be conformable.

2.44 Conglomerate — A rock consisting of rounded pebbles held together by a natural cement.

2.45 Creep

a) It is an inelastic long duration deformation under a constant load, usually below the yield stress, and at a low strain rate.

b) The slow movement of soil and loose rock down a slope under the combined influence of gravity, frost and groundwater. The edges of rock beds which have suffered creep may appear to have considerable dips.

2.46 Cross Bedding — Depositional structures in sedimentary rocks, characterized by an arrangement of thin individual identifiable lamina in straight sloping lines or concave forms lying transverse to the planes of primary stratification. Also designated as cross stratification, or current bedding.

2.47 Crumbly — Rock traversed by numerous closely-spaced incipient joints, fractures, etc, due, to which, on top of hammer, breaks into small pieces of about, or less than 0·5 cm size. The property is commonly found in tectonically disturbed fine-grained rocks.

2.48 Cryptocrystalline — Crystalline, but so fine-grained that the individual components cannot be seen with a magnifying glass (for example, *Chalcedony*, *chert*, etc).

2.49 Decomposition — Weathering of rocks and change in mineral composition accomplished essentially by chemical process.

2.50 Degradation — A process which tends to wear down the land surface.

2.51 Detritus — Matter worn from rocks by mechanical means. A general term applicable to several grades or types.

2.52 Dip — *See also* **2.58** of IS : 5940-1970†.

a) *Apparent Dip* — Dip measured in any direction other than the one at right angles to the strike of a bedding or planer feature. This is always less than the true dip.

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†Glossary of mining terms (geology).

b) *True Dip* — Dip measured at right angles to the strike of a bedding or planer feature.

2.53 Disintegration — A term often applied to the natural mechanical breaking down of a rock on weathering.

2.54 Dolerite — Dark crystalline igneous rock of specific mineral composition and texture, forming intrusions, for example, dykes and sills.

2.55 Dolomite — A mineral composed of calcium, magnesium carbonate or a rock consisting predominantly of that mineral.

2.56 Drift — A general term for all the rock debris which has been transported by glaciers and is deposited, either directly from the ice or from the accompanying meltwater. A drift in engineering geology, also called an adit, refers to an artificial, horizontal or inclined passage to examine the subsurface, foundation condition.

2.57 Dunite — A rock composed essentially of olivine.

2.58 Dyke (Dike) — A tabular body of igneous rock that cuts across the structure of adjacent rock.

2.59 Effluent Stream

a) A stream whose upper surface stands lower than the water table in the locality through which it flows, and which is not separated from the water table by an impervious bed.

b) A stream that flows out of another stream or out of a lake.

2.60 En-echelon — Arranged in parallel to sub-parallel partially overlapping lines.

2.61 Eolian — A term applied to deposits arranged by the wind, as the sands and other loose materials along shores.

2.62 Epicentre — That part of the earth's surface directly above the origin of an earthquake.

2.63 Erosion — The general wearing away of the land by wind, running water and other agencies.

2.64 Fault — A plane of fracture in a rock body along which there has been displacement.

a) *Fault Breccia* — Broken rock along a fault.

b) *Fault Gouge* — The broken rock along a fault, if finely ground is called fault gouge. It is soft clayey material formed by the crushing of rock but may subsequently get somewhat decomposed and altered by percolating water.

c) *Fault Plane* — The plane or surface along which relative movement takes place in a fault.

d) *Fault Zone* — If the rupture along which faulting has taken place occupies a wide strip, it is designated as a fault zone. It is occupied by gouge, breccia or mylonite.

2.65 **Fire Clay** — Any clay capable of resisting very high heat without passing into a glassy clay; no alkaline substances being presented to form a flux.

2.66 **Fissility** — The tendency which some rocks possess of separating into this laminate along bedding, foliation or cleavage planes.

2.67 **Fissure** — An extensive irregular crack or fracture in rocks.

2.68 **Flaggy** — Capable of being split into slabs from 10 mm to 100 mm thick.

2.69 **Fluvial** — An adjective designating a river as the agent forming the feature.

2.70 **Fluviatile Deposits** — Sedimentary deposits laid down by a river.

2.71 **Fluvio-glacial**

a) Produced by streams which have their source in glacial ice.

b) Pertaining to combined action of rivers and glaciers.

2.72 **Fold** — Undulations or waves in the rocks of the earth.

2.72.1 *Fold Axis* — A line joining points of maximum curvature in a fold.

2.73 **Foliation** — The laminated structure resulting from segregation of different minerals into layers parallel to the schistocity.

2.74 **Foot Wall** — The block that lies below the fault.

2.75 **Fresh Rock** — Rock fresh from effects of weathering.

2.76 **Fuller's Earth** — A fine earth resembling clay but lacking plasticity. It is much the same chemically as clay but can have a higher percentage of molecular water. It is high in magnesia.

2.77 **Gabbro** — *See* IS : 1123-1975†.

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†Method of identification of natural building stones (*first revision*).

2.78 Geodesy — The science and art of measuring portions of earth's surface by traingulation and astronomical observations.

2.79 Geology — Science which deals with the original history and structure of the earth.

2.80 Geophysics — The study of the physical characteristics and properties of the earth; including geodesy, seismology, meteorology, oceanography, glacier movements, atmospheric electricity, terrestrial magnetism and tidal phenomena.

2.81 Geomorphology — The investigation of the history of geological changes through the interpretation of topographic forms.

2.82 Geothermal — Pertain to the heat of the earth's interior.

2.83 Gneiss — A course grained igneous or metamorphic rock in which bends rich in granular minerals alternate with bands in which schistose minerals predominate.

2.84 Gondite — A spessartite (garnent)—quartz rock, probably produced by metamorphism of magnaniferous sediments and named after Gonds of India, where the Gondite series occurs.

2.85 Gouge — *See* **2.63**.

2.86 Grain — A direction of splitting in rock less pronounced than the rift and usually right angles to it.

2.87 Granite — *See* IS : 1123-1975†.

2.88 Granulite — Even grained metamorphic rock poor in micas and rich in minerals, such as quartz, felspars, pyroxenes and garnet which lack a tabular or prismatic habit. Some degree of segregation banding due to alignment of flat lenses of quartz or felspar typically impart a regular foliation to rock. Products of high grade regional metamorphism.

2.89 Ground Water or Phreatic Water — That part of the subsurface water or water retained in an earth mass within the zone of saturation.

2.90 Hade — The angle of inclination of a fault measured from the vertical.

2.91 Hanging Valley — A valley, the floor of which is notably higher than the level of the valley to which it leads to.

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†Method of identification of natural building stones (*first revision*).

2.92 **Hanging Wall** — That block that lies above the fault.

2.93 **Hardpan** — A term applied to the layers of gravel which are usually present a short distance below the surface and which are cemented by limonite or some similar bond.

2.94 **Humus** — A dark brown substance, formed usually in the soil, due to the partial decomposition of vegetal matter; the organic portion of the soil.

2.95 **Hybrid** — Formed by the mixture of two magmas or by the assimilation of a rock already consolidated by the magma of later intrusion. Migmatite is a general term for hybrid rocks resulting from the introduction of granitic magma, or granitizing fluids into a pre-existing rock.

2.96 **Hydrothermal** — Pertaining to hot water, especially with respect to its action in dissolving, re-deposition and otherwise producing mineral changes in rocks.

2.97 **Hypabyssal** — A general term applied to intrusive rocks that have consolidated under conditions intermediate between those affecting surface flows and those affecting deep seated plutonic masses. The term applies to dykes, sills and small saucer shaped bodies formed at a shallow or moderate depths.

2.98 **Igneous Rock** — A rock formed by solidification of molten matter that originated within the earth.

2.99 **Induration** — The process of hardening of sediments or other rock aggregates through cementation, pressure, heat, or other cause.

2.100 **Influent Stream** — A stream or a stretch of a stream is influent with respect to groundwater if it contributes water to the zone of saturation. The upper surface of such a stream stands higher than the water table or other piezometric surface of the aquifer to which it contributes.

2.101 **Inlier** — An outcrop of rock surrounded on all sides by geologically younger rocks.

2.102 ***In-situ*** — Applied to rocks, soils and fossils that are situated in the place where they were originally formed or deposited.

2.103 **Isoseismal** — A line separating zones of varying intensity of earthquake effects; or, in other words, a line connecting all points on the earth's surface where earthquake effects are of the same intensity.

2.104 **Joint** — Vertical, inclined or horizontal planes of division which are found in all rocks.

2.104.1 *Master Joint* — The most strongly developed joints of a region.

2.105 Kankar — A term meaning stone now restricted to concretionary masses of calcium carbonate occurring in alluvium.

2.106 Kaolin — A white or slightly stained clay due to decomposition of a highly felspathic rock.

2.107 Karst Topography — A type of landform developed in a region of easily soluble limestone bed rock. It is marked by sinkholes, interpersed with abrut ridges and irregular protuberant rocks, and by caverns and underground streams.

2.108 Khondalite* — It is a buff-coloured schistose rock with abundant garnet (altered to brownish aggregates) and visible sheafs of sillimanite and some graphite. This rock, named after the Khonds of Orissa is often banded and contain variable amount of microperthite and microcline besides quartz.

2.109 Kodurite — The type rock of Kodurite series, composed of potash felspar, spandite (garnet) and apatite.

2.110 Lamination — The layering or bedding less than 25 mm in thickness in a sedimentary rock. The more or less distinct alternation of material, which differs one from the other in grain size, composition or colour.

2.111 Landslide — A perceptible downward and outward movement of slopeforming materials — natural rock, soil, artificial fills, or, combination of these materials.

2.112 Laterite — Highly weathered iron rich residual portion of a rock resulting from the decomposition of iron and aluminium silicates under tropical climate and leaching out of silica. It has worm like voids and round grained structures.

2.113 Lensing — The thinning out of a stratum in one or more directions.

2.114 Lignite — A brownish-black coal in which the alternation of vegetal material has proceeded further than in peat but not so far assbituminous coal.

2.115 Limestone — Rock consisting predominantly of calcium carbonate.

2.116 Lithification — The consolidation of sediments into stones.

2.117 Lithology — A study of rock based on the megascopic examination of samples. Also broadly to mean the composition and texture of rocks.

2.118 Lit-par-lit Structure — The structure exhibited by a foliated or fissile rock that has been intruded by sheets and tongues of magma along innumerable partings. The structure is commonly seen in schistose rocks and the laminations of original rock and magma may be very thin and continuous.

2.119 Lithomarge — A smooth, compact variety of common kaolin.

2.120 Loam — A detrital deposit consisting of nearly equal proportions of particles of the sand, silt and clay grade.

2.121 Loess — A sediment, commonly non-stratified and commonly unconsolidated, composed dominantly of silt-size particles, ordinarily with accessory clay and sand, deposited primarily by the wind.

2.122 Marble — *See* IS : 1123-1975†.

2.123 Marl — A general term for calcareous clay or calcareous loam.

2.124 Massive

a) Of homogeneous structure without stratification, flow banding, foliation, schistocity, etc; and

b) Occurring in thick beds, free from minor joints and lamination.

2.125 Master Joints — *See* **2.103**.

2.126 Matrix — The natural material in which pebbles, fossils, crystals, etc, are embedded.

2.127 Megascopic — A field classification based on characters determiable in hand specimens.

2.128 Metabasic — A general term for metamorphosed basic rocks.

2.129 Metamorphic Rock — Rock which has been altered by the action of heat pressure or migrating fluids acting separately or together.

2.130 Metasomatism — The process of mineral or rock alteration by the agency of dissolution.

2.131 Micaceous — Characteristic of, pertaining to, or containing mica.

2.132 Migmatite* — *See* **2.93**.

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†Method of identification of natural building stones (*first revision*).

2.133 **Miliolite*** — A fine grained limestone of aeolian origin occurring in Kathiawar and consisting of tests of *Milioline* and other foraminifera, colitic grains and mineral fragments cemented by calcite.

2.134 **Montmorillonite** — A hydrated silicate of aluminium, highly swelling in nature; one of the important clay-minerals, and the chief constituent of bentonite and fuller's earth.

2.135 **Morrum** — Residual, ferruginous, coarse-grained disintegration product of any rock type.

2.136 **Moraine** — An accumulation of rock material transported and deposited by a glacier.

2.137 **Mylonite*** — A compact chert like rock, without cleavage, but with streaky or banded structure, produced by extreme granulation and shearing of rocks which have been pulverised and rolled out.

2.138 **Nappe*** — A large body of rock that has moved forward a considerable (several kilometres) horizontal distance from its original position, either by over thrusting or by recumbent folding.

2.139 **Neogene** — The latter of the two periods in which the cenozoic era is divided. Also the system of strata deposited during that period. It comprised the Miocene, pliocene, pleistocene and Holocene or Recent epochs.

2.140 **Neotectonic** — Science dealing with the study of movements of the earth's crust that have taken place during the late Tertiary (Neogene) and Quarternary periods.

2.141 **Offset** — In the description of faults, the term means the horizontal distance between the outcrops of a dislocated bed.

2.142 **Orogeny** — The process of forming mountains, particularly by folding and thrusting.

2.143 **Outcrop** — A part of the body of rock that is exposed at the surface of the ground.

2.144 **Outlier** — An outcrop of rock surrounded on all sides by geologically older rocks.

2.145 **Outwash** — Detrital material removed from a glacier by melt water and laid down by stream beyond the glacier itself.

2.146 **Overbreak** — The quantity of rock that is excavated beyond the perimeter previously fixed as the section of an underground opening.

2.147 Overburden — In engineering geology, the term designates loose soil, sand, gravel, etc, that lies over the bedrock.

2.148 Palaeogene — The earlier of the two periods into which the cenozoic era is divided. Also the system of strata deposited during that period. It comprises the Palaecene, Eocene and Oligocene epochs.

2.149 Paragenesis — A term used for the characteristic laws of association of minerals and the order of succession in Igneous rocks.

2.150 Pegmatite — A body of igneous rock of exceptionally coarse grains, generally containing quartz, mica and felspar.

2.151 Pelitic — *See* **2.19**.

2.152 Petrography — A general term for systematic description of rocks, based on observations in the field, on hand-specimen and on thin section.

2.153 Phreatic — *See* **2.87**.

2.154 Phyllite — *See* IS : 1123-1975†.

2.155 Pinching — The continued thinning of a stratum in a given direction until it disappears.

2.156 Plasticity — The property of a substance whereby it can be permanently deformed without rupture.

2.157 Plunge of Fold — The inclination of the axis of the fold with a horizontal plane. A fold, the axis of which is not horizontal is designated as a plunging fold.

2.158 Plutonic — The term is generally applied to rocks and intrusions that have consolidated at great depths.

2.159 Porcellanite — An argillaceous, high silica rock that is dense and hard and possesses the texture and fracture of unglazed porcelain.

2.160 Pot Hole — Circular, nearly circular or elliptical depressions in rocks caused by the constant swirl of an eddy which carries pebbles or sand round in one spot.

2.161 Pozzolana — An essentially silicious or silicious alluminous material which while in itself possessing no cementitious properties will, in finely divided form and in the presence of water, react with calcium hydroxide at ordinary temperature to form compounds possessing cementitious properties.

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†Method of identification of natural building stones (*first revision*).

2.162 Quartzite — A granulose metamorphic rock consisting essentially of quartz and also sand stone cemented by silica which has grown in optical continuity around each fragment.

2.163 Psammitic — *See* **2.18.**

2.164 Quick Ground — Ground in a loose incoherent state; soft watery strata, for example, running sand.

2.165 Quick Sand — Sand, which is, or becomes upon the access of water 'Quick', that is, shifting, easily movable, or semi-liquid, or by severe loss of buoyancy.

2.166 Regolith — A general term for the superficial blanket of denudation products which is widely distributed over the bedrock. The term includes weathering residues, alluvium, and aeolian and glacial deposits.

2.167 Regur — A residual dark coloured loamy soil of volcanic regions of India, rich in organic matter, that is, not derived from forest growth.

2.168 Reh — A sterilizing saltine efflorescence that forms on the surface of parts of the valley of the Ganga from the evaporation of water rising from beneath.

2.169 Rift — A planer property whereby rocks split relatively easily in a direction.

2.170 Rift Valley — A relatively long and narrow trough like valley formed by the sinking of a strip of the earth's crust between two approximately parallel and opposed normal faults or zones of faulting.

2.171 Ripple Marks — Corrugation in sandstones produced by the agitation of waves or wind when the rock was being deposited.

2.172 Rock — In engineering geology, any consolidated, solid or coherent and relatively hard mass of mineral matter, forming a part of the earth's solids crust.

2.173 Rubble — Rough irregular pieces of broken rock.

2.174 Rudaceous — Rocks consisting chiefly of gravel, pebbles; cobbles or boulders.

2.175 Sand Bar — A bar of sand or silt formed by circulation cells in rivers, decelerated flows at their mouths, or of sand formed in the long shore stretch by wave action.

2.176 Sand Dune — A mound, ridge, or hillock of loose sand, heaped up by wind.

2.177 Sand Rock — A poorly indurated variety of sandstone with practically no cementation.

2.178 Sandstone — A bedded rock composed of grains of sand, principally of quartz, cemented naturally together.

2.179 Scaly — A property of rocks to separate into thin fragments.

2.180 Scrap — A relatively steep, straight slope of some height.

2.181 Schist — *See* IS : 1123-1975†.

2.182 Schistocity — The property, due to parallelism of the cleavage planes of the lamellar minerals, of a foliated rock whereby it can be split into thin flakes or lenticles.

2.183 Scoriae — Light cellular masses of volcanic rock resembling clinkers.

2.184 Scree — A cheap of rock waste at the base of chiff, or a sheet of waste covering, slope below a cliff same as talus.

2.185 Seam — A stratum or bed of coal or other mineral.

2.186 Secretions — Substances deposited within empty cavities in any rock.

2.187 Sedimentary Rock — Rock formed by accumulation of sediment or material in water or from air.

2.188 Shale — A fine grained, earthy sedimentary rock that is somewhat indurated clay and is characterized by a thinly layered laminated structure, by which it is differentiated from clay. It is usually harder than clay and has less tendency to slake in water.

2.189 Shattered Zone — Applied to a belt in which the rock is cracked in all directions, resulting in a network of small veins.

2.190 Shearing — The deformation of rocks by cumulative small lateral movements along inumerable parallel planes.

2.191 Shear Zone — A zone in which shearing has occurred on a large scale so that the rock is crushed and brecciated.

2.192 Sheeted Zone — A zone of closely spaced joints.

2.193 Silification — The introduction of, or, replacement by silica.

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†Method of identification of natural building stones (*first revision*).

2.194 Sill* — A tabular body of igneous rock that has been injected while molten, between layers of sedimentary or igneous rocks or along the foliation of metamorphic rocks.

2.195 Silt — A general name for muddy deposit of fine sediment.

2.196 Siltstone — A very fine grained sandstone, the particles of which are predominantly of silt grade.

2.197 Sink Holes or Swallow Holes — Where rocks, such as salt, gypsum or limestone have been locally dissolved away, the earth may sink and form a cup-shaped basin to which this name is given.

2.198 Slabby — Cleaved or finely parallel — jointed rocks which split into tabular plates from 25 to 100 mm thick.

2.199 Slake — The crumbling and disintegration of earth material when exposed to air or moisture.

2.200 Slate — A fine grained metamorphic rock, possessing well developed fissility.

2.201 Slickenside — The polished, grooved, and straiated surface produced on rocks by movement along a fault or sometimes at the bottom of a landslide. The grooves are parallel to the direction of movement but they may be straight or curved.

2.202 Slide — The descent of a mass of earth or rock down a hill or mountain side.

2.203 Slope Wash — Soil and rock material that is being or has been moved down a slope predominantly by the action of gravity assisted by running water, that is, not concentrated into channels.

2.204 Slump — The settling of beds, often accompanied by opening up of pre-existing joints or development of new joints in the bed rock owing to the removal of toe-support due to valley cutting.

2.205 Soft Ground — Rocks about underground openings that do not stand well and require heavy support.

2.206 Soil — Superficial, unconsolidated mantle of disintegrated and decomposed rock material.

2.207 Sound Rock (Competent or Foundation Grade Rock) — In engineering geology, the bed rock which is fresh and free from effects of slumping creep.

2.208 Stalactite — Columnar deposits, generally of calcite; formed on the roof of a cavern by the drip of mineral solutions.

2.209 Stalagmite — Uprising, columnar deposits, generally of calcite, formed on the floor of a cavern by the drip of mineral solutions from the roof.

2.210 Stratification — A structure produced by deposition of sediments in beds or layers, laminae lenses, etc.

2.211 Stratum — A layer of rock more or less uniform throughout; a lithological unit, consisting of one or more beds.

2.212 Strike — *See* **2.191** of IS : 5940-1970†.

2.213 Structure — The sum total of the structural features of an area. In petrology, one of the larger features of a rockmass, like bedding, flow banding, jointing, cleavage and brecciation; also the sum total of such features.

2.214 Subsidence — Movement of material on the earth's surface characterized by a dominant vertical movement with little or no lateral movement.

2.215 Syenite — Rock containing felspathic minerals, such as sodalite or analcite corresponding chemically with the alkali syenite group.

2.216 Syncline — A trough like down fold in stratified rocks.

2.217 Synform — An upright or inclined fold closing downwards with unknown stratigraphic relationship of the individual beds therein.

2.218 Talus — *See* **2.184**.

2.219 Tear (Wrench) Fault — Steeply dipping to nearly vertical strike slip fault that trends transverse to the strike of the deformed rocks.

2.220 Tectonic — Pertaining to the rock structures and external forms resulting from the deformation of the earth's crust.

2.221 Texture — Geometrical aspects of the component particles of a rock, including size, shape and arrangement.

2.222 Throw of a Fault — The amount of vertical displacement produced by a fault.

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†Glossary of mining terms (geology).

2.223 **Thrust** — A reverse fault that is characterized generally by a low angle of dip.

2.224 **Till** — Unstratified, unconsolidated, heterogenous mixture of clay, sand, gravel and boulders deposited by ice, with little or no transportation by water. Also called boulder-clay.

2.225 **Tillite** — A term applied to consolidated and indurated boulder clays formed during glacial epochs prior to that of pleistocene.

2.226 **Tone** — Each distinguishable shade variation of the exposed rock for quick identification of geological features.

2.227 **Trap** — A term usually applied to volcanic igneous rocks that are neither coarsely crystalline nor cellular. It is still used in a general sense by engineers and geologists for dark coloured and heavy igneous rocks composed essentially of ferromagnesiam minerals, basic felspars and a little or no quartz. In India it is commonly used for basalt rock, for example, Deccan trap.

2.228 **Tufa** — The cellular deposits of mineral springs, usually calcareous or siliceous. Same as calcareous sinter or silicous sinter.

2.229 **Ultrabasic Rocks** — Some igneous rocks and most variteties of meteorities containing less than 45 percent silica; containing virtually no quartz or felspar and composed essentially of ferromagensian silicates, metallic oxides and sulphides, and native metals, or of all the three.

2.230 **Unconformity** — A surface of erosion or non-deposition usually the former that separates younger strata from older ones.

2.231 **Varved Clay** — It is essentially of glacial origin and commonly consists of clay and silt having seasonal layers; a summer valve of coarse, and a winter varve of finer material.

2.232 **Volcanic Rocks** — Finely crystalline or glassy igneous rock resulting from volcanic activity at or near the surface of the earth. Also known as extrusive rock.

2.233 **Volcanic Tuff** — A solidified rock of volcanic ash and volcanic sand brought down the slopes of volcano by rain, compacted under its own weight and by the action of water. It is natural pozzolana when powdered.

2.234 **Water Table** — The upper surface of a zone of saturation except where the surface is formed by an impervious body. No water table exists where the upper surface of a zone of saturation is formed by an impermeable body.

2.235 **Weathering** — The group of processes, such as chemical action of air, rain water, plants, bacteria and the mechanical action of changes of temperature, whereby rocks on exposure to the weather change in character, decays, and finally crumbles into soil. Technically, weathering can take place to the depth to which atmospheric oxygen penetrates.

2.236 **Window** — Circular or ellipsoidal break in an over thrust sheet whereby the rocks beneath the overthrust are exposed.

2.237 **Zenolith** — A fragment of other rock or of an earlier solidified portion of the same mass enclosed in an igneous rock.

2.238 **Zeolite** — A generic name for a group of minerals occurring in cracks and cavities of igneous rocks, especially the more basic laves. Zeolites are hydrous silicates of aluminum with either sodium, or calcium, or both, and rarely barium or strontium. They have little economic importance.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s^2
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002

Telephones : 26 60 21, 27 01 31

Telegrams : Manaksanstha

Regional Offices:

		Telephone
Western : Novelty Chambers, Grant Road	BOMBAY 400007	37 97 29
Eastern : 5 Chowringhee Approach	CALCUTTA 700072	27 50 90
Southern : C. I. T. Campus	MADRAS 600113	41 24 42
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